Claim Amendments

This listing of claims will replace all prior versions, and listings, of claims in the application. Currently amended claims are shown with additions underlined and deletions in ~~strikethrough text~~. No new matter is added by this amendment.

1. (Currently amended) A system for constructing a pre-stressed modular construction for retaining or supporting an applied load, comprising:

a base;

a header stack, wherein said header stack is comprised of a plurality of header units that are stacked in a complementary relationship to provide mechanical interlocking between adjacent header units to resist relative movement between said adjacent header units in a plurality of directions, wherein one of said plurality of header units is in a complementary relationship with said base to provide mechanical interlocking between said header unit and said base to resist relative movement between said header unit and said base in a plurality of directions; and

an active reinforcement element configured to cooperate with said header stack so that post-tensioning said active reinforcement element imparts a corresponding pre-stressing force into said header stack.

2. (Original) The system of claim 1, wherein the corresponding pre-stressing force is transferred to said header stack at at least one predetermined lock-off point.

3. (Original) The system of claim 2, further comprising:

a passive reinforcement element extending through a passthrough duct in at least one of said header units, said passive reinforcement element configured such that it does not carry load distributed in said header stack.

4. (Original) The system of claim 2, further comprising:

a passive reinforcement element extending longitudinally through a passthrough duct in at least one of said header units, said passive reinforcement element configured such that it carries an applied load.

5. (Original) The system of claim 2, wherein said header stack comprises:

a plurality of main header units.

6. (Original) The system of claim 5, wherein said header stack further comprises:

a plurality of sub-header units, said main header units and said sub-header units being stacked to form said header stack.

7. (Original) The system of claim 6, wherein each of said main header units and said sub-header units comprises:

a center element having a top face, and a bottom face;

a first end element disposed at one end of said center element; and

a second end element disposed at another end of said center element.

8. (Original) The system of claim 7, wherein said main header units and said sub-header units further comprise a curved portion at one of said first end element and said second end element.

9. (Original) The system of claim 7, wherein said main header units and said sub-header units further comprise a curved portion at said first end element and said second end element.

10. (Original) The system of claim 7, wherein said first end element has a top face and a bottom face and said second end element has a top face and a bottom face, said top face and said bottom face of said first end element and said second end element being coplanar with said top face and said bottom face of said center element, respectively.

11. (Original) The system of claim 7, wherein said first end element and said second end element are integrally formed with said center element.

12. (Original) The system of claim 7, further comprising:

a plurality of indentations on one of the top and bottom faces of said center element; and

a plurality of protrusions on the other of the top and bottom faces of said center element corresponding to said plurality of indentations, wherein said protrusions on each said sub-header unit and said main header unit are configured to engage said corresponding indentations in an adjacent header unit.

13. (Original) The system of claim 7, further comprising:

first corrugations on one of the top and bottom faces of said center element; and

second corrugations on the other of the top and bottom faces of said center element corresponding to said first corrugations, wherein said second corrugations on each said sub-header unit and said main header unit are configured to nest with said corresponding first corrugations in an adjacent header unit.

14. (Previously presented) The system of claim 13, further comprising:

first corrugations on one of the top and bottom faces of at least one of said first end element and said second end element; and

second corrugations on the other of the top and bottom faces of said at least one of said first end element and said second end element corresponding to said first corrugations, wherein said second corrugations on each said sub-header unit and said main header unit are configured to nest with said corresponding first corrugations in an adjacent header unit.

15. (Original) The system of claim 7, wherein said first end element defines a first passthrough duct extending through said first end element and said second end element defines a second passthrough duct extending through said second end element, wherein said passthrough ducts are configured to receive said active reinforcement element.

16. (Original) The system of claim 7, wherein said first end element and said second end element of said header unit define said lock-off points and said active reinforcement element is disposed in said header stack.

17. (Original) The system of claim 2, further comprising:

a harping element coupled to said header stack at a harping point such that said active reinforcement element is disposed external to said header stack and is deformed at said harping point such that said active reinforcement element forms a series of substantially straight segments.

18. (Original) The system of claim 17, further comprising a second active reinforcement element disposed in said header stack.

19. (Original) The system of claim 7, wherein said main header units and said sub-header units are symmetrical about a line perpendicular to a longitudinal axis of said main header units and said sub-header units.

20. (Original) The system of claim 7, wherein said main header units are symmetrical about a line perpendicular to a longitudinal axis of said main header units and said sub-header units are asymmetrical about a line perpendicular to a longitudinal axis of said sub-header units.

21. (Original) The system of claim 7, wherein said main header units are asymmetrical about a line perpendicular to a longitudinal axis of said main header units and said sub-header units are symmetrical about a line perpendicular to a longitudinal axis of said sub-header units.

22. (Original) The system of claim 7, wherein said main header units are asymmetrical about a line perpendicular to a longitudinal axis of said main header units and said sub-header units are asymmetrical about a line perpendicular to a longitudinal axis of said sub-header units.

23. (Original) The system of claim 1, further comprising a structural member for coupling two or more header stacks.

24. (Original) The system of claim 12, further comprising a structural member for coupling two or more header stacks.

25. (Original) The system of claim 24, wherein said structural member defines a secondary passthrough duct that extends through said structural member.

26. (Original) The system of claim 25, wherein said structural member is coupled between two of said main header units and is abutting one of said sub-header units such that said secondary passthrough duct in said structural member is in registry with at least one of said passthrough ducts in said two main header units.

27. (Original) The system of claim 26, wherein said structural member is positioned between one of said first end element and said second end element of each of said main header units.

28. (Original) The system of claim 26, wherein said structural member is positioned between each of said first end element and said second end element of each said main header unit.

29. (Original) The system of claim 1, further comprising:

a tieback transfer beam disposed between two of said header units and extending between two or more of said header stacks.

30. (Original) The system of claim 29, further comprising:

a ground anchor coupled to said tieback transfer beam.

31. (Original) The system of claim 5, further comprising:

a complementary structural element disposed between two of said main header units and extending between two or more of said header stacks.

32. (Original) The system of claim 25, further comprising:

a complementary structural element disposed between two of said header units and extending between two or more of said header stacks.

33. (Original) The system of claim 31, wherein said complementary structural element comprises:

a passthrough duct in registry with one of said passthrough ducts in said header units; and

a passthrough channel extending through said complementary structural element.

34. (Original) The system of claim 33, further comprising:

a ground anchor coupled to said complementary structural element and configured to extend through said passthrough channel.

35. (Original) The system of claim 34, further comprising:

a raised portion extending from said complementary structural element and defining an opening in communication with said passthrough channel for receiving said ground anchor.

36. (Original) The system of claim 2, wherein each of said header units comprises:

a top face and a bottom face;

a base element having a first end and a second end;

a head element having a first end and a second end; and

a pair of side elements extending between each of said first end and said second end of said base element and said head element.

37. (Original) The system of claim 36, further comprising:

a passive reinforcement element extending through a passthrough duct in at least one of said header units, said passive reinforcement element configured such that it does not carry load distributed in said header stack.

38. (Original) The system of claim 36, further comprising:

a passive reinforcement element extending longitudinally through a passthrough duct in at least one of said header units, said passive reinforcement element configured such that it carries an applied load.

39. (Original) The system of claim 37, wherein each of said header units further comprises:

at least one passthrough duct in one of said base element and said head element.

40. (Original) The system of claim 36, wherein each of said header units defines a plurality of passthrough ducts.

41. (Original) The system of claim 36, further comprising:

a plurality of indentations in one of the top and bottom faces of each said header unit; and

a plurality of protrusions on the other of the top and bottom faces of each said header unit corresponding to said indentations, such that said protrusions on each said header unit are configured to engage said corresponding indentations in an adjacent header unit.

42. (Original) The system of claim 36, further comprising:

first corrugations in one of the top and bottom faces of each said header unit; and

second corrugations on the other of the top and bottom faces of each said header unit corresponding to first corrugations, such that said second corrugations on each said header unit are configured to nest with said corresponding first corrugations in an adjacent header unit.

43. (Original) The system of claim 36, wherein one of said base element and said head element extends past said side elements such that a flange is formed adjacent each said side element.

44. (Original) The system of claim 36, wherein said side elements couple with said base element such that an indentation is formed adjacent said base element.

45. (Original) The system of claim 44, further comprising:

a passive reinforcement element disposed in said indentation.

46. (Original) The system of claim 43, further comprising:

a structural member disposed between two header stacks and coupled to said flange.

47. (Original) The system of claim 45, further comprising:

a structural member disposed between two header stacks and coupled to said indentation.

48. (Original) The system of claim 39, further comprising:

a complementary structural element disposed between two header units and extending between two or more of said header stacks.

49. (Original) The system of claim 48, wherein said complementary structural element comprises:

a passthrough duct in registry with one of said passthrough ducts in said header units; and

a passthrough channel extending through said complementary structural element.

50. (Original) The system of claim 49, further comprising:

a ground anchor coupled to said complementary structural element and extending through said passthrough channel.

51. (Original) The system of claim 50, further comprising:

a raised portion extending from said complementary structural element and defining an opening in communication with said passthrough channel for receiving said ground anchor.

52. (Original) The system of claim 6, further comprising:

a corner closure stack, wherein said corner closure stack is comprised of a plurality of corner closure units; and

a second active reinforcement element configured to cooperate with said corner closure stack so that post-tensioning said second active reinforcement element imparts a corresponding pre-stressing force into said corner closure stack.

53. (Original) The system of claim 52, wherein each of said corner closure units comprises:

a body element having a top face and a bottom face; and

a junction element having a top and bottom face disposed at one end of said body element.

54 (Original) The system of claim 53, wherein said junction element is integrally formed with said body element.

55. (Original) The system of claim 54, wherein said junction element extends from said body element in an angular configuration.

56. (Previously presented) The system of claim 55, further comprising:

a plurality of indentations on one of the top and bottom faces of said body element; and

a plurality of protrusions on the other of the top and bottom faces of said body element corresponding to said plurality of indentations, where said protrusions on each said corner closure unit are configured to engage said corresponding indentations in an adjacent corner closure unit.

57. (Original) The system of claim 55, further comprising:

first corrugations on one of the top and bottom faces of said body element; and

second corrugations on the other of the top and bottom faces of said body element corresponding to said first corrugations, wherein said second corrugations on each said corner closure unit are configured to nest with said corresponding first corrugations in an adjacent corner closure unit.

58. (Original) The system of claim 57, further comprising:

first corrugations on one of the top and bottom faces of said junction element; and

second corrugations on the other of the top and bottom faces of said junction element corresponding to said first corrugations, wherein said second corrugations on each said corner closure unit are configured to nest with said corresponding first corrugations in an adjacent corner closure unit.

59. (Original) The system of claim 55, wherein said junction element defines a first passthrough duct extending through said junction element and said body element defines a

second passthrough duct extending through said body element, wherein said passthrough ducts are configured to receive said second active reinforcement element.

60. (Original) The system of claim 59, wherein said second active reinforcement element is disposed in said corner closure stack.

61. (Original) The system of claim 55, further comprising:

a harping element coupled to said corner closure stack at a harping point such that said second active reinforcement element is disposed external to said corner closure stack and is deformed at said harping point such that said second active reinforcement element forms a series of substantially straight segments.

62. (Original) The system of claim 61, further comprising a third active reinforcement element disposed in said header stack.

63. (Original) The system of claim 55, further comprising a structural member for coupling a corner closure stack to a header stack.

64. (Original) The system of claim 63, wherein said structural member defines a secondary passthrough duct that extends through said structural member.

65. (Original) The system of claim 64, wherein said structural member is coupled between two of said corner closure units such that said secondary passthrough duct in said structural member is in registry with at least one of said passthrough ducts in said two corner closure units.

66. (Original) The system of claim 65, wherein said structural member is positioned between said junction elements of each of said corner closure units.

67. (Original) The system of claim 52, further comprising:

a complementary structural element disposed between two of said corner closure units and extending between said corner closure stack and two or more of said header stacks.

68. (Original) The system of claim 67, wherein said complementary structural element comprises:.

a passthrough duct in registry with one of said passthrough ducts in said corner closure units; and

a passthrough channel extending through said complementary structural element.

69. (Original) The system of claim 68, further comprising:

a ground anchor coupled to said complementary structural element and configured to extend through said passthrough channel.

70. (Original) The system of claim 69, further comprising:

a raised portion extending from said complementary structural element and defining an opening in communication with said passthrough channel for receiving said ground anchor.

71. (Cancelled)

72. (Currently amended) A pre-stressed modular construction for retaining or supporting an applied load, comprising:

a base;

at least two header stacks, wherein each of said header stacks is comprised of a plurality of header units that are stacked in a complementary relationship to provide mechanical interlocking between adjacent header units to resist relative movement between said adjacent header units in a plurality of directions, wherein one of said plurality of header units in each of said header stacks is in a complementary relationship with said base to provide mechanical interlocking between said header unit and said base to resist relative movement between said header unit and said base in a plurality of directions;

at least one pre-stressing tendon for each of said header stacks, wherein each pre-stressing tendon is configured to cooperate with its header stack so that post-tensioning said pre-stressing tendon prior to application of the applied load imparts a corresponding pre-stressing force into its header stack at at least one lock-off point; and

a structural member coupled to said at least two header stacks.

73. (Cancelled)

74. (Previously presented) The system of claim 1, wherein said base is a foundation element.

75. (Previously presented) The system of claim 1, wherein said base is a complementary structural element.

76. (Previously presented) The pre-stressed modular construction of claim 72, wherein said base is a foundation element.

77. (Previously presented) The pre-stressed modular construction of claim 72, wherein said base is a complementary structural element.

78. (Previously presented) The system of claim 12, further comprising:

a plurality of indentations on one of the top and bottom faces of at least one of said first end element and said second end element; and

a plurality of protrusions on the other of the top and bottom faces of said at least one of said first end element and said second end element corresponding to said plurality of indentations, wherein said protrusions on each said sub-header unit and said main header unit are configured to engage said corresponding indentations in an adjacent header unit.

79. (Previously presented) The system of claim 56, further comprising:

a plurality of indentations on one of the top and bottom faces of said junction element; and

a plurality of protrusions on the other of the top and bottom faces of said junction element corresponding to said plurality of indentations, wherein said protrusions on each said corner closure unit are configured to engage said corresponding indentations in an adjacent corner closure unit.

80. (Previously presented) The system of claim 82, wherein said adjacent faces comprise a top face of one of said adjacent header units and a bottom face of another of said adjacent header units.

81. (Previously presented) The pre-stressed modular construction of claim 85, wherein said adjacent faces comprise a top face of one of said adjacent header units and a bottom face of another of said adjacent header units.

82. (Currently amended) A system for constructing a pre-stressed modular construction for retaining or supporting an applied load, comprising:

a base;

a header stack, wherein said header stack is comprised of a plurality of header units that are stacked in a complementary relationship to provide mechanical interlocking between adjacent faces of adjacent header units to resist relative movement between said adjacent header units in a plurality of directions, wherein said adjacent faces are perpendicular to a longitudinal axis of at least one of said adjacent header units, and wherein one of said plurality of header units is in a complementary relationship with said base to provide mechanical interlocking between said header unit and said base to resist relative movement between said header unit and said base in a plurality of directions; and

an active reinforcement element configured to cooperate with said header stack so that post-tensioning said active reinforcement element imparts a corresponding pre-stressing force into said header stack.

83. (Previously presented) The system of claim of 82, wherein said base is a foundation element.

84. (Previously presented) The system of claim 82, wherein said base is a complementary structural element.

85. (Currently amended) A pre-stressed modular construction for retaining or supporting an applied load, comprising:

a base;

at least two header stacks, wherein each of said header stacks is comprised of a plurality of header units that are stacked in a complementary relationship to provide mechanical interlocking between adjacent faces of adjacent header units to resist relative movement between said adjacent header units in a plurality of directions, wherein said adjacent faces are perpendicular to a longitudinal axis of at least one of said adjacent header units, and wherein one of said plurality of header units in each of said header stacks is in a complementary relationship with said base to provide mechanical interlocking between said header unit and said base to resist relative movement between said header unit and said base in a plurality of directions;

at least one pre-stressing tendon for each of said header stacks, wherein each pre-stressing tendon is configured to cooperate with its header stack so that post-tensioning said pre-stressing tendon prior to application of the applied load imparts a corresponding pre-stressing force into its header stack at at least one lock-off point; and

a structural member coupled to said at least two header stacks.

86. (Previously presented) The pre-stressed modular construction of claim 85, wherein said base is a foundation element.

87. (Previously presented) The pre-stressed modular construction of claim 85, wherein said base is a complementary structural element.

88. (Currently amended) An apparatus, comprising:

a header unit configured to be stacked in a complementary relationship with an adjacent header unit to provide mechanical interlocking between the header unit and the adjacent header unit to resist relative movement between said header unit and said adjacent header unit in a plurality of directions, the header unit being configured to be in a complementary relationship with a base to provide mechanical interlocking between said header unit and said base to resist relative movement between said header unit and said base in a plurality of directions; and

an opening defined by said header unit, the opening configured to receive an active reinforcement element, the active reinforcement element configured to impart a pre-stressing force associated with the header unit.